Landscape Vegetation Analysis
Supplemental Information on Temporary Road Water Resources Effects

Temporary Roads

Roads, temporary roads, skid trails associated with timber harvest generate significantly more sediment than timber harvest units (e.g. Megahan and Kidd 1972; Leaf 1970; Luce and Black, 1999). Erosion rates are highest in the year after disturbance and recovery significantly, but are still elevated as compared to undisturbed conditions after five years (Megahan 1974). Best Management Practices can be implemented to reduce, but not eliminate, erosion and sedimentation from roads (Burroughs and King, 1989). The LaVA project area has an extensive existing road network, none-the-less 600 miles of new temporary road construction is estimated to be necessary for the timber removal aspects of the project. In order to reduce costs and long term impacts associated with the transportation system, the Responsible Official has determined the new roads will be temporary roads that are not retained for long-term management of National Forest System lands. Road obliteration, decommissioning or reclamation after the use of a road ends can be an effective means to reduce chronic erosion and sedimentation (Litschert and MacDonald, 2009). Reclamation techniques vary in cost and effectiveness at reducing erosion (Bagley, 1998). Treatment of the road surface only, such as by ripping or scarification, is a less costly technique that reduces chronic erosion (Luce, 1997), but generally is not as effective as the higher cost technique of full recontouring (Switalski et al 2004; Lloyd et al, 2013).

Road decommissioning is defined as *"[a]ctivities that result in the stabilization and restoration of unneeded roads to a more natural state*." (36 CFR 212.1, FSM 7705 – Transportation System). The Forest Service Manual (7712.11- Exhibit 01) identifies five levels of treatments for road decommissioning. These include the following:

1. Block entrance
2. Revegetation and water barring
3. Remove fills and culverts
4. Establish drainage and remove unstable road shoulders
5. Full obliteration re-contouring and restoring natural slopes

Region 2 policy, outlined in Forest Service Manual Supplement 7700-96-1 provides the following direction on obliteration of short term facilities: *"7731.5 - Road Obliteration. Obliterate short-term facilities following completion of the activity for which they were constructed. Obliteration is the act of eliminating the functional characteristics of a travelway and the reestablishment of natural resource production capability. The intent is to make the corridor unusable as a road and stabilize it against soil loss. ... Restoration of the original ground slope is not necessarily an objective unless aesthetic considerations are paramount."*

D.Gloss
03/4/19

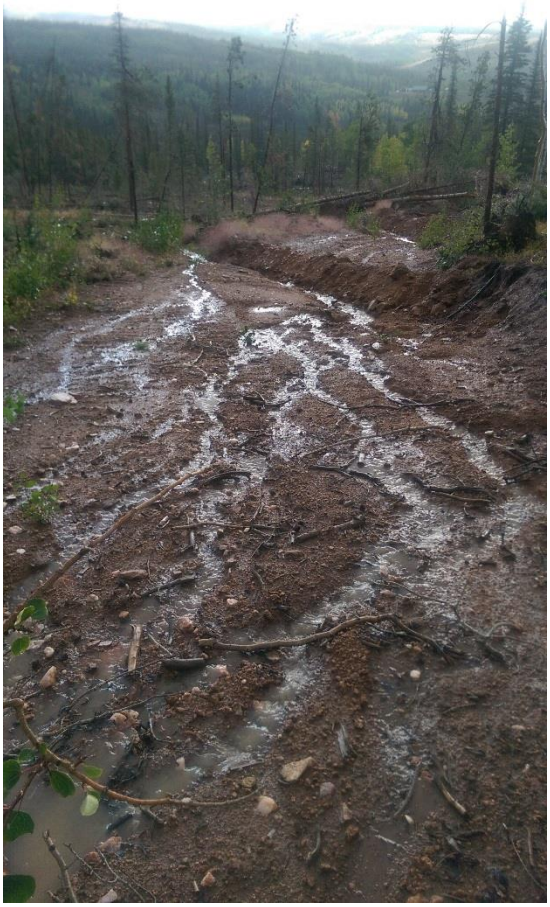
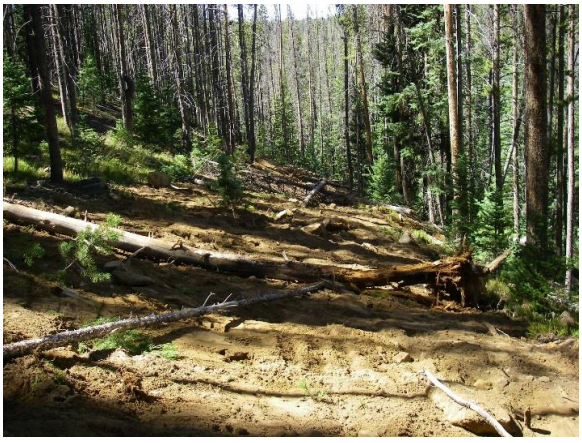


Figure 1. Soldier Summit Timber Sale Road (Sierra Madre Range) which was blocked at the entrance and water barred after sale activities were completed. Monitoring observations approximately one year later (September 15, 2017), revealed runoff and erosion during a moderate rainfall event. The objective of design criteria in the LaVA project are to provide more complete obliteration that will result in less runoff and erosion and shorten the length of time with adverse water resource impacts.

Design criteria have been developed in order to meet the intent of this policy in the LaVA project area. The location and methods used to construct and decommission each temporary road, will be determined during project implementation, following this policy direction and design criteria.

Figure 2. Example of road which was obliterated by scarification or ripping, similar to North Savery Design Criteria, Compaction #1.

Cut/fill road before recontouring



After recontouring

Figure 3. Example of road which was obliterated by full recontouring, similar to LaVA Design Criteria, Erosion Control #1.

D.Gloss
03/4/19

Landscape Vegetation Analysis
Supplemental Information on Temporary Road Water Resources Effects

Temporary Roads – Length of time for hydrologic effects:
Temporary roads are typically in service for 1-4 years, then obliterated within 3 years (Timing PDF #1), with 1-5 years for ground cover to effectively reduce erosion and runoff to pre-disturbance conditions (see Figures 1, 4 & 5). Many individual temporary roads *at the site-scale* are likely to have short-term sediment effects, being constructed, used and obliterated within one or two operating seasons, with effective ground cover being established within a couple years. Per Watershed Conservation Practices Handbook definition of long-term effects being greater than 5 years, *at the watershed-scale* (e.g a sale with multiple harvest units and several temporary roads being used for harvest over several years), *and in some cases at the site-scale* (e.g. an individual temporary road), overall temporary roads from the LaVA project *at the watershed scale* have long-term watershed condition effects. Evaluation of the short versus long term effects of temporary roads on stream health requires more detailed site-specific information, which will be addressed during project implementation. Appendix A, Decision Making Triggers for the LaVA Project, will be used to ensure long-term stream is maintained to meet Forest Plan Standards and State of Wyoming designated uses for surface waters.

Temporary Roads, Road Decommissioning - Monitoring:
Monitoring temporary road rehabilitation and road decommissioning is critical to ensuring projects have been implemented as described and are effective at meeting desired objectives. Monitoring for the LaVA project is planned through a variety of existing Forest Service monitoring efforts. For active timber sales and road decommissioning projects, implementation monitoring is typically conducted by project or contract administration staff. The Forest also participates in the National Best Management Practices (BMP) program, which is intended to improve management of water quality consistent with the Clean Water Act. From 2013 to 2017, the Forest has conducted interdisciplinary team implementation and effectiveness monitoring through this national program on two completed road decommissioning projects and seven timber harvest/fuels reduction projects, including temporary timber sale road construction (Gloss, 12/13/17 query of National Best Management Practices database).

In addition to these specific project monitoring efforts, the Forest periodically monitors the implementation and effectiveness of past road decommissioning projects (including some timber sale temporary roads) at over 1,400 sites. In 2017, for example, we inspected 15% of these sites (222) and found over 95% of the past road decommissioning efforts were effective at precluding motorized use and the sites were returning to a more natural state (Gloss, 12/13/17 query of Inspection_2017 HydroTransportationInventory geodatabase). In order to track long term recovery and effectiveness of road decommissioning projects the Forest has eleven long-term photo point monitoring sites established in different ecosystems (e.g. Figures 4 and 5, from Gloss 2017 Specialist Report pages 17 & 19). Information from these monitoring efforts has been utilized to improve project level work (e.g. incorporating additional signing or physical barriers in locations where motorized use persists on a decommissioned route; supplementing erosion control or revegetation efforts when unacceptable erosion persists on a decommissioned route) and well as guide programmatic level input (e.g. refine decommissioning techniques; refine design criteria language used in project planning). The implementation and effectiveness of temporary road obliteration planned under the LaVA project can be evaluated using these existing Forest Service monitoring efforts.

D.Gloss
03/4/19

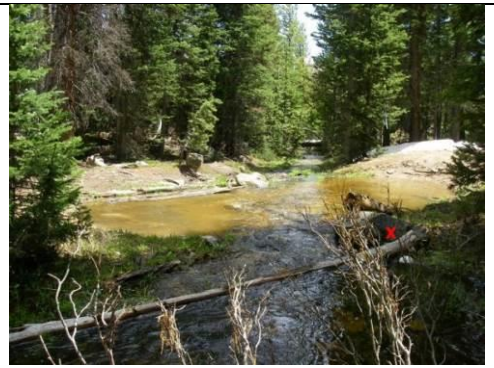
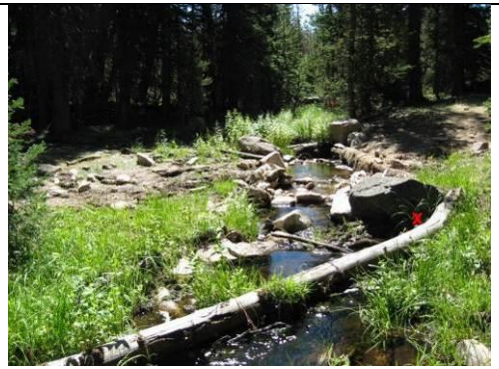
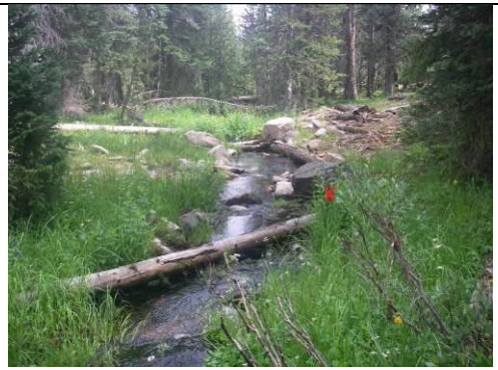
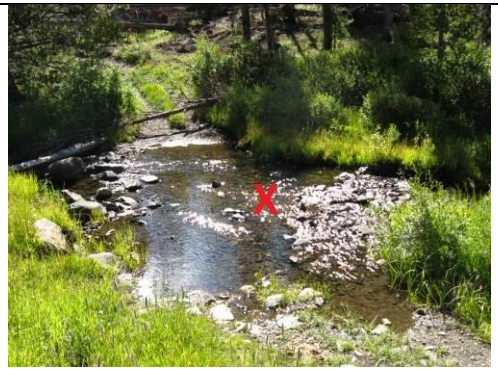
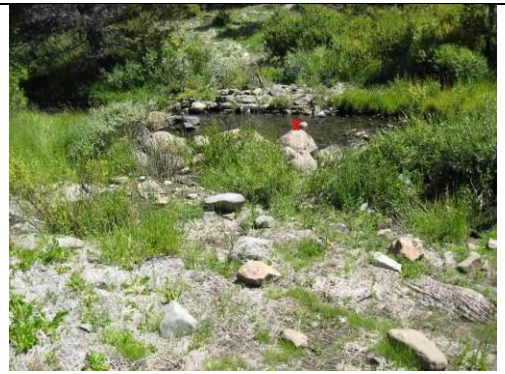
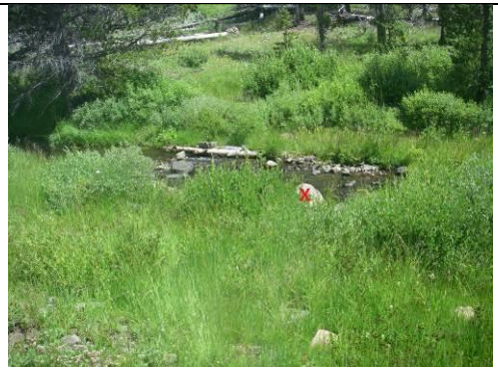
Route 561.02—Stream Crossing Restoration Example		
		
Before decommissioning--2009	One year after decommissioning--2010	Six years after decomissioning--2015
Route 580.07—Stream Crossing Restoration Example		
		
Before decommissioning--2009	One year after decommissioning--2010	Six years after decommissioning--2015

Figure 4. Examples of reducing erosion and sedimentation and restoration of stream channel and riparian areas through decommissioning road crossings. Snowy Range Mountains, Douglas Creek drainage.

D.Gloss
03/4/19

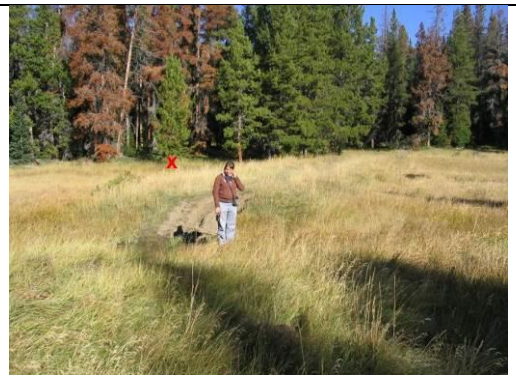
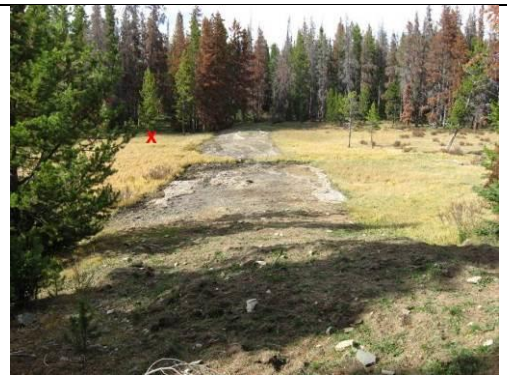
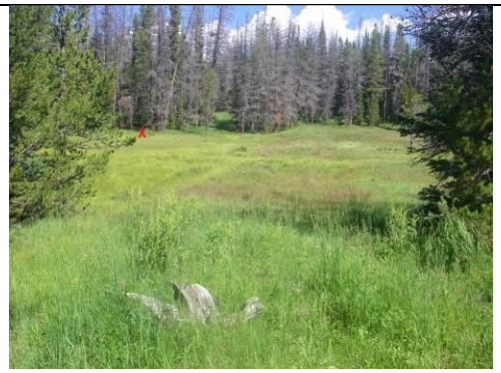
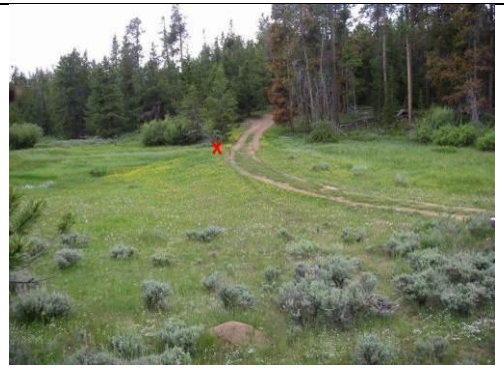
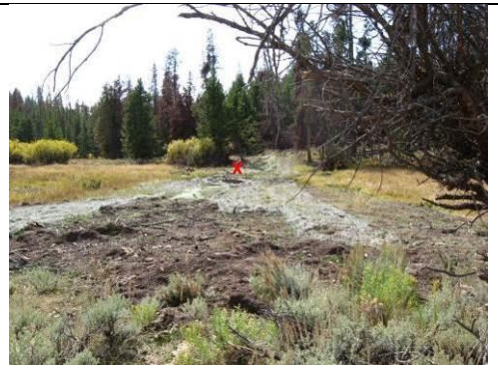
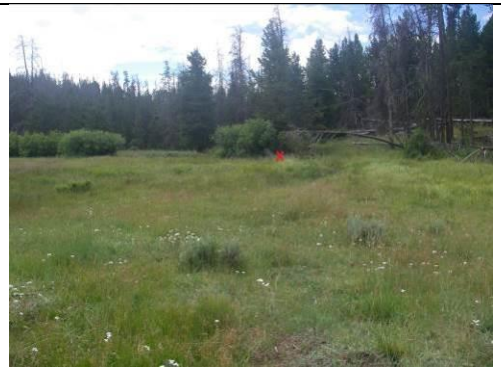
Route 524.03—Wetland Restoration Example		
		
Before decommissioning--2008	One year after decommissioning--2009	Seven years after decommissioning--2015
Route 526.I.02—Wetland Restoration Example		
		
Before decommissioning--2008	One year after decommissioning--2009	Seven years after decommissioning--2015

Figure 5. Examples of restoration of riparian area and wetlands through decommissioning road crossings. Snowy Range Mountains, Douglas and Boswell Creek drainages.

Landscape Vegetation Analysis
Supplemental Information on Temporary Road Water Resources Effects

D.Gloss
03/4/19